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EXAMINER	
HOGAN, MARY C	

ART UNIT	PAPER NUMBER
2123	

DATE MAILED: 07/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/784,158	WEGERICH ET AL.	
	Examiner	Art Unit	
	Mary C Hogan	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 February 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/18/01, 9/24/01*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This application has been examined.

2. **Claims 1-49** have been examined and rejected.

Drawings

3. **Figures 2 and 4** should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. The descriptions of Figures 2 and 4 describe the drawings as showing "prior art" (specification, page 6). See MPEP § 608.02(g).

4. **Figures 4, 6A and 6B** are objected to because the labels of the elements in the figures are unclear, specifically, Figure 4, elements 416, 418 and 420, Figure 6A, elements 602, 604, 606, and 608, Figure 6B, elements 650,652,654,656,658, and 662.

5. Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

6. The disclosure is objected to because of the following informalities. Appropriate correction is required.

7. **Page 4, line 10**, "include" should read "including".

8. **Page 7, line 31**, "the" should be inserted before the word "snapshot".

Claim Rejections - 35 USC § 112

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. **Claims 16,22-24,29,30,41 and 46-48** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

11. **Claims 16 and 41** recite, "the bin number is provided only for dominant driver parameters and a bin number of two is used for all other parameters". There is no recitation of this limitation in the specification.

12. **Claims 22-24, 29,30,46-48** recite dividing vector space logarithmically and geometrically and selecting every nth vector, n being a positive whole number less than or equal to half the number of said plurality of system vectors. These limitations are disclosed briefly in the specification, however an inadequate description of these limitations is given.

Claim Interpretation

13. **Claims 6,7,12,36 and 37** are directed to a "cumulative density function". It is noted that "cumulative density function" is defined as the probability that a variate, X, takes on a value less than or equal to a number x.

14. **Claims 16 and 41** recite, "the bin number is provided only for dominant driver parameters and a bin number of two is used for all other parameters". There is no recitation of this limitation in the specification. It was determined that this claim is directed to sampling the areas of data that are densely populated more frequently than areas where data is sparsely populated. The bin number of two was determined to be an arbitrary constant that can be chosen as a value for sampling areas that are sparsely populated.

15. **Claims 22-24, 29,30,46-48** recite dividing vector space logarithmically and geometrically and selecting every nth vector, n being a positive whole number less than or equal to half the number of said

plurality of system vectors. These limitations are disclosed briefly in the specification, however an inadequate description of these limitations is given. It was determined that these claims are directed to different methods of dividing the vector space and methods of sampling data.

Claim Rejections - 35 USC § 102

16. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

17. **Claims 1,3,4,6-8,10-32,34,36-49** are rejected under 35 U.S.C. 102(b) as being anticipated by Guiver et al (U.S. Patent Number 5,809,490), herein referred to as **Guiver**.

18. As to **Claim 1**, **Guiver** teaches a method of selecting input vectors for extraction of representative data for training of an adapting model comprising **(column 4, lines 29-31)**: receiving signals as input from a plurality of sensors **(column 3, lines 40-46 and Figure 2, step 220)**, ordering the set of training vectors according to a corresponding value in each vector of a particular sensor **(column 5, lines 24-26)**, dividing the set of training vectors according to equally spaced ranges **(column 5, lines 1-3 and lines 13-19, equi-probable clusters)** and selecting at least one vector from each of the equally spaced ranges for training the adaptive model **(column 5, lines 30-33)**.

19. As to **Claim 3**, **Guiver** teaches carrying out the ordering, dividing and selecting **steps (column 5, lines 1-3, 23-27, 30-33)**.

20. As to **Claims 4,11,34 and 42**, **Guiver** teaches ordering the set of training vectors according to the magnitude of the particular sensor **(column 8, lines 4-10, Figure 6, element 184 and description)** wherein "weights" are assigned to each neuron that are in turn, used to determine which neuron is closest to the input data.

21. As to **Claims 6,7,12,36 and 37**, **Guiver** teaches ordering the set of training vectors using a statistical technique **(Claim 8)**. It is concluded that "statistical technique" encompasses providing a cumulative density function for the particular sensor. Further, it is noted that the cumulative density function would show the probability that a neuron is close to the input vector; therefore, the vector with

the sensor value, or probability, highest within the range would be the vector with the highest probability of being closest to the input vector.

22. As to **Claim 8**, **Guiver** teaches an adaptive apparatus for monitoring a system instrumented with sensors comprising: data acquisition means **(column 3, lines 38-46)**, an empirical modeling module responsive to the data acquisition means for providing indications about the operational states of the system **(column 4, lines 28-31)**, a data store **(column 3, lines 29-31)**, and a training module disposed to distill characteristic operational sensor data acquired from the system to a representative set of sensor data **(column 4, lines 43-46)** by selecting from the characteristic operational sensor data time-correlated observations representative of regularly spaced intervals along an ordering of the observations according to values in the observations of a particular sensor **(column 5, lines 1-3, 11-12, 24-26, 31-33)**.

23. As to **Claim 10**, **Guiver** teaches selection of observations representative of regularly shaped intervals is performed for an ordering for each sensor in the system **(column 5, lines 11-19 where the number of clusters is typically determined by a fraction of the total data, or equi-probable clustering)**.

24. As to **Claim 13 and 38**, **Guiver** teaches a computer program product **(column 3, lines 9-11)** comprising: collecting historical data **(column 3, lines 41-65)**, selecting a system parameter **(column 5, lines 11-13 where the "number of clusters" is the parameter)**, ordering a plurality of system vectors **(column 5, lines 24-26)**, binning vector space for said selected parameter **(column 5, lines 1-3)**, selecting a vector from each bin and selected said vectors forming a training set and said training set forming said empirical model for monitoring system operation **(column 5, lines 30-46)**.

25. As to **Claim 14 and 39**, **Guiver** teaches selecting a system parameter comprising identifying dominant driver parameters **(column 8, lines 23-33)** where the "winning" neuron is a dominant driver parameter.

26. As to **Claim 15 and 40**, **Guiver** teaches selecting a bin number determining the number of bins in which the vector space is divided **(column 5, lines 11-22)**.

27. As to **Claims 16 and 41**, **Guiver** teaches that the areas that are more densely populated have a higher instance of vectors chosen than sparsely populated regions **(column 8, lines 24-30)**.

28. As to **Claims 17 and 18**, **Guiver** teaches ordering the system vectors **(column 5, lines 23-26)**. It is concluded that "ordering" these vectors in ascending or descending order are just different ways to order the data that are well known in the art.

29. As to **Claim 19 and 43**, **Guiver** teaches wherein the step of selecting a vector from each bin, one of the plurality of system vectors is identified as having a value for said selected parameter closest to a

bin magnitude of each bin, identified ones being selected for initial conclusion in the training set **(column 7, lines 35-40 and column 8, lines 10-14)** wherein the vector that is closest to the input vector is chosen for the set.

30. As to **Claims 20,21,44 and 45**, **Guiver** teaches selecting a vector from each bin or cluster that is closest to the input vector **(column 8, lines 4-14)**. It is concluded that "closest to" encompasses values that are "closest to but not less than" and "closest to but not more than".

31. As to **Claims 22,23,29,30,46 and 47**, it is concluded that binning vector space logarithmically and geometrically are just different ways to separate the data into bins or clusters and are well known in the art.

32. As to **Claims 24 and 48**, it is concluded that selecting every nth vector, n being a positive whole number less than or equal to half the number of said plurality of system vectors is just a method of sampling data and n is and arbitrary constant that can be chosen by numerous methods.

33. As to **Claim 25**, **Guiver** teaches checking system parameters to determine if other parameters remain unselected **(Figure 3, element 260)**, selecting an unselected parameter **(Figure 3, element 254)**. As to repeating steps c through h until all system parameters have been selected, it is concluded that steps c-e have been done already as in **Figure 2** where the element 228 points to **Figure 3** which describes working on clusters to select a working data set. Finally, selected training vectors are stored for modeling and monitoring system operations **(column 5, lines 43-46)** and redundant vectors are eliminated **(column 8, lines 23-33)**.

34. As to **Claim 26**, **Guiver** teaches a control unit for controlling a monitored **system (Figure 1, element 112)**, a data acquisition unit **(column 3, lines 28-37)**, a memory **(column 3, lines 29-31)**, a sorter **(column 5, lines 1-3 and 11-26)**, and a vector selector **(column 5, lines 30-46)**.

35. As to **Claim 27 and 49**, **Guiver** teaches means for eliminating redundant vectors **(column 8, lines 23-33)**, wherein vectors that "win" the most are biased so that they no longer "win" which helps develop a uniform data representation **(column 8, lines 44-46)**, and a memory storing said training set **(column 3, lines 28-36)**.

36. As to **Claim 28 and 31**, **Guiver** teaches dividing vector space into a plurality of equally spaced bins **(column 5, lines 13-19, Figure 5 and description)**, selects a vector from each bin, each selected vector being identified as having a parameter value closest to the corresponding bin value **(column 8, lines 4-14)**.

37. As to **Claim 32**, **Guiver** teaches a computer program product for selecting input vectors for extraction of representative data for training of an adaptive model, said computer program product

comprising a computer usable medium having computer readable program code thereon **(column 3, lines 9-11)**, said computer readable program code comprising: means for receiving signals **(column 3, lines 38-46)**, means for ordering the set of training vectors **(column 5, lines 24-26)**, means for dividing the set of training vectors according to equally spaced ranges **(column 5, lines 13-19)** and means for selecting at least one vector from each of the equally spaced ranges for training the adaptive model **(column 5, lines 30-33)**.

Claim Rejections - 35 USC § 103

38. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

39. The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

40. **Claims 2,5,9,33 and 35** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Guiver** as applied to Claims 1,8, and 32 above, and further in view of Gross et al (U.S. Patent Number 5,764,509), herein referred to as **Gross**.

41. As to **Claims 2,9, and 33 Guiver** teaches selecting at least one vector from each of the equally spaced ranges for training the adaptive model **(column 5, lines 30-33)**.

42. **Guiver** does not expressly teach including each vector that contains a maximum or minimum value for any given sensor across the set of training vectors.

43. **Gross** teaches including each vector that contains a maximum or minimum value for any given sensor across the set of training vectors creating an "optimal" training set since the vectors span the full range that all sensors or data sources have noted during their training period **(column 5, lines 53-64)**.

44. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the selection of training vectors as taught in **Guiver** with the selection of training vectors as taught in **Gross** since **Gross**'s method vectors creates an "optimal" training set since the vectors span the full range that all sensors or data sources have noted during their training period **(column 5, lines 53-64)**.

45. As to **Claims 5 and 35**, **Guiver** teaches ordering the set of training vectors according to the magnitude of the particular sensor and selecting the vector which is "closest" to the input data **(column 8, lines 4-10, Figure 6, element 184 and description)**.

46. **Guiver** does not expressly teach that this "closest" vector is the vector with a sensor value highest within the range.

47. **Gross** teaches selecting a vector which is "closest" to the input data wherein the largest element value in the vector identifies the "closest" learned state to the input data **(column 6, lines 33-39 and column 7, lines 12)**.

48. It would have been obvious to one of ordinary skill in the art at the time the invention was made that selecting the value which is "closest" to the input data as taught in **Guiver** is the largest or highest element or sensor value in the vector as taught in **Gross** since both **Guiver (column 8, lines 4-10, Figure 6, element 184 and description)** and **Gross (column 6, lines 33-39 and column 7, lines 12)** teach this method of selecting a vector which is "closest" to the input data for development of a model.

Conclusion

49. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

50. Klimasauskas et al (U.S. Patent Number 6,278,962) teaches a data derived linear model trained using training data to generate major predictions of defined output variables.

51. http://mathworld.wolfram.com/DistributionFunction.html gives a definition for "cumulative density function".

52. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary C. Hogan whose telephone number is 703-305-7838. The examiner can normally be reached on 7:30AM-5PM Monday-Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska can be reached on 703-305-9704. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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